Non-Anatomic Hepatic Resection Using Chang's Needle for Porcelain Gallbladder

Andrzej L. Komorowski · David Dominguez Usero ·
Concepcion Ramos Curado ·
Jose Ramon Martin-Hidalgo Rodil

Received: 19 April 2011 / Accepted: 29 March 2012 / Published online: 14 April 2012
© Association of Surgeons of India 2012

Abstract We present a simple technique of nonanatomic resection of liver parenchyma for porcelain gallbladder infiltrating gallbladder bed, that is, segments IVb and V of the liver. The resection has been carried out with the use of straight 18-gauge stainless steel multi-use needle designed for hepatic resections (Chang's needle). This simple, safe, and cost-effective technique can be used for nonanatomic liver resections by surgeons less experienced in liver surgery.

Keywords Porcelain gallbladder · Liver resection

Introduction

Traditionally, the presence of extensive calcification of the gallbladder, also referred to as porcelain gallbladder, was thought to be associated with gallbladder cancer. However, this association has not been confirmed by recent studies [1]. Even in the absence of malignancy the cholecystectomy in case of porcelain gallbladder can be technically difficult. While in the majority of cases it can be performed laparoscopically [2], patients with advanced disease may require open cholecystectomy or even multiorgan resections [1]. The resection of the gallbladder bed comprising parts of segment IVb and V of the liver can sometimes be necessary.

The technique of hepatic nonanatomic wedge resection requires the use of advanced surgical instrumentarium in order to minimize the risk of hemorrhage and bile leaks. However, the use of the simple and effective straight needle can also allow for safe resection even in the hospitals that are not equipped with specially designed hepatic resection instruments [3].

Materials and Methods

The patient was a 52-year-old female with porcelain gallbladder infiltrating segments IVb and V of the liver. Right oblique subcostal Kocher incision was made. After laborious separation of the gallbladder from multiple adhesions to transverse colon and duodenum, the porcelain-like gallbladder infiltrating the liver was exposed. We divided the cystic duct and cystic artery, but since the gallbladder was impossible to excise from its bed and since we had doubts as to the nature of infiltration we opted for partial resection of IVb and V segments together with the gallbladder using straight needle (Fig. 1) described by Chang [3]. The technique of liver parenchyma transection consisted of performing a row of interlocking mattress sutures with number 1 silk. The sutures were placed with the help of the Chang's needle through the whole thickness of liver parenchyma (Fig. 2). After placing a complete line of sutures (Fig. 3) the parenchyma transection was performed with Kelly clamp (Kellyclasia). All tubular structures were secured with ligatures. There was no bleeding nor bile leaks from the cut liver surface. At the end of the procedure we placed a Surgicel™ on the cut liver surface and left a single Penrose drain. The postoperative course was uneventful and the patient was discharged home on fourth postoperative day.

A. L. Komorowski (✉) · D. Dominguez Usero ·
C. Ramos Curado · J. R. Martin-Hidalgo Rodil
Servicio de Cirugía General, Hospital Virgen del Camino,
Carretera de Chipiona s/n,
11540 Sanlúcar de Barrameda, Cadiz, Spain
e-mail: alkomorowski@wp.pl

Fig. 1 The stainless steel 18-gauge straight needle with a hook at its tip (Chang's needle)

Results and Discussion

Waiting times for surgery even for cancer patients are long. Unfortunately, this statement is true also for countries with economically stable and relatively rich healthcare systems such as USA [4].

Liver surgery has experienced important advances in recent decades. Also, the number of patients that qualify for liver surgery has risen. Patients who do not require complicated, extensive liver surgery are being sent to specialized liver surgery centers because those centers have access to expensive, sophisticated equipment required to safely perform liver parenchyma division.

The use of simple 18-gauge stainless steel needle, as described by Chang [3] can be one of the solutions to the above-mentioned problem. The technique of liver resection with the use of the needle is safe, easy, and can be used to control even major bleeding. Certainly, the presented patient was operated on for benign disease, but the technique for liver metastasectomy in peripherally located liver lesion is virtually the same as the one described above [3]. The application of the same technique for bigger liver resections

in the same, nonspecialized setting would require intraoperative ultrasound to verify that hepatic remnant is not deprived of arterial blood flow.

The cost of one liver resection performed with the use of surgical staplers can be greater than 11,000 Euro. Other techniques of liver transection are even less cost-effective [5]. At the same time the cost of liver resection with Chang's needle consist only of constant operating room and surgical team costs since the costs of the re-usable needle and silk thread is negligible. The only extra cost in the presented case was that of Surgicel™ placed on a cut liver surface (+/- 300 Euro). However, the benefits of Surgicel™ in this setting are not confirmed.

The Chang's needle can only be used in open hepatobiliary surgery. This may be considered as a disadvantage of the technique since laparoscopic liver resections are gaining popularity.

The presented technique is safe and simple. We think that it can be easily used in simple, peripheral, nonanatomic liver resections even by nonspecialized teams. Such an approach allows to lower waiting times for patients listed for major liver surgery in highly specialized centers and also allows to

Fig. 2 The needle is passed through the whole thickness of the liver and the number 1 silk is caught with its tip

Fig. 3 A completed line of interlocking mattress sutures with line of dissection marked with electrocautery over the glissonian surface

diminish waiting times for patients with benign disease or small peripheral malignant diseases by performing safe surgery in low volume centers.

Conclusion

The nonanatomic liver resection using Chang's needle is easy and safe in the general surgical department setting.

Acknowledgments The authors thank Professor Yu-Chung Chang from National Cheng Kung University, Tainan, Taiwan for his valuable help in implementing this procedure and remarks on surgical technique.

Conflict of interest The authors state no conflict of interest.

References

1. Kim JH, Kim WH, Yoo BM, Kim JH, Kim MW (2009) Should we perform surgical management in all patients with suspected porcelain gallbladder? *Hepatogastroenterology* 56:943–945
2. Lacaine F (2003) Is the laparoscopic approach appropriate for porcelain gallbladder? *J Chir (Paris)* 140:115–119
3. Chang YC, Nagasue N, Chen CS, Lin XZ (2006) Simplified hepatic resections with the use of a Chang's needle. *Ann Surg* 243:169–172
4. Bilimoria KY, Ko CY, Tomlinson JS, Stewart AK, Talamonti MS, Hynes DL, Winchester DP, Bentrem DJ (2011) Wait times for cancer surgery in the United States: trends and predictors of delays. *Ann Surg* 253:779–785
5. Delis SG, Bakoyiannis A, Karakaxas D, Athanassiou K, Tassopoulos N, Manesis E, Ketikoglou I, Papakostas P, Dervenis C (2009) Hepatic parenchyma resection using stapling devices: peri-operative and long-term outcome. *HPB (Oxford)* 11:38–44